2020 Juvenile Salmon Survival - Travel Time

Jerry McCann

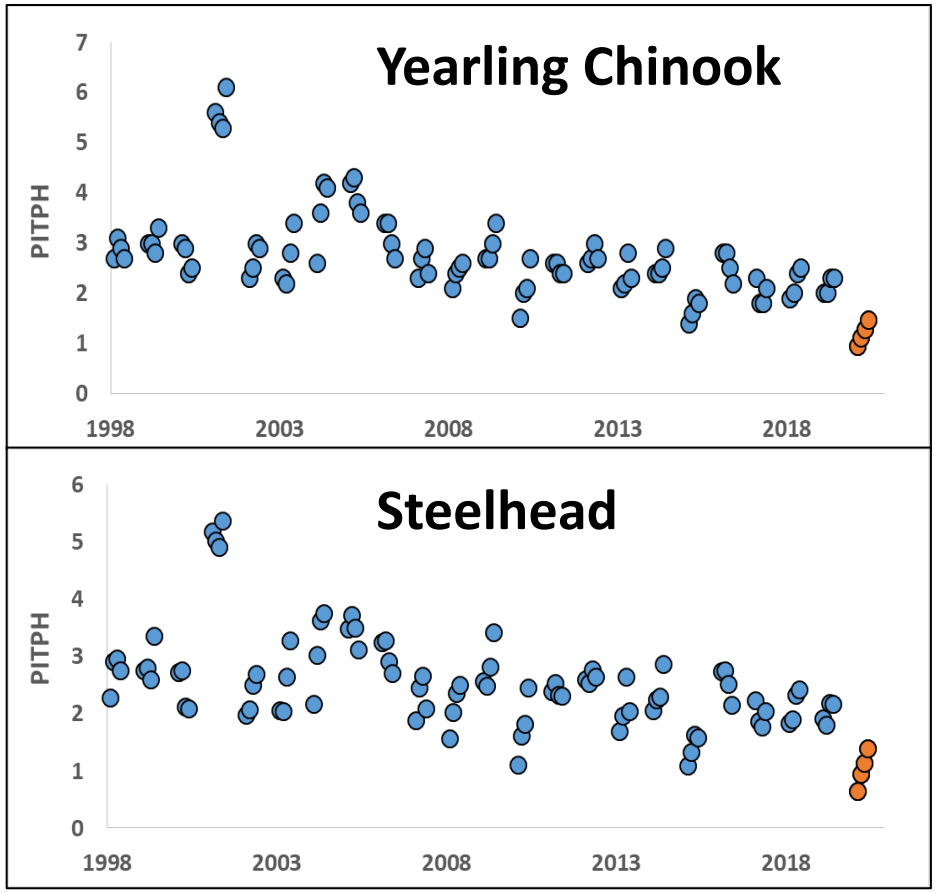
Fish Passage Center

Results

- Results for combined HW Chinook and HW steelhead PIT-tag cohorts (LGR to BON) based on passage date at LGR
  - Spring : Four 2-week blocks from 4/8 through 6/2
- Results for Hatchery subyearling Chinook PIT-tag cohorts (LGR to MCN) based on passage date at LGR
  - Summer: Four 2-week blocks from 5/20 through 7/15
- LGR PIT-tag detection probability and survival via route
  - Estimates of proportion passing via each route (RSW, BYP, and UNK)
  - Estimates of survival via each route
- LGR RSW PIT-tag hourly passage timing

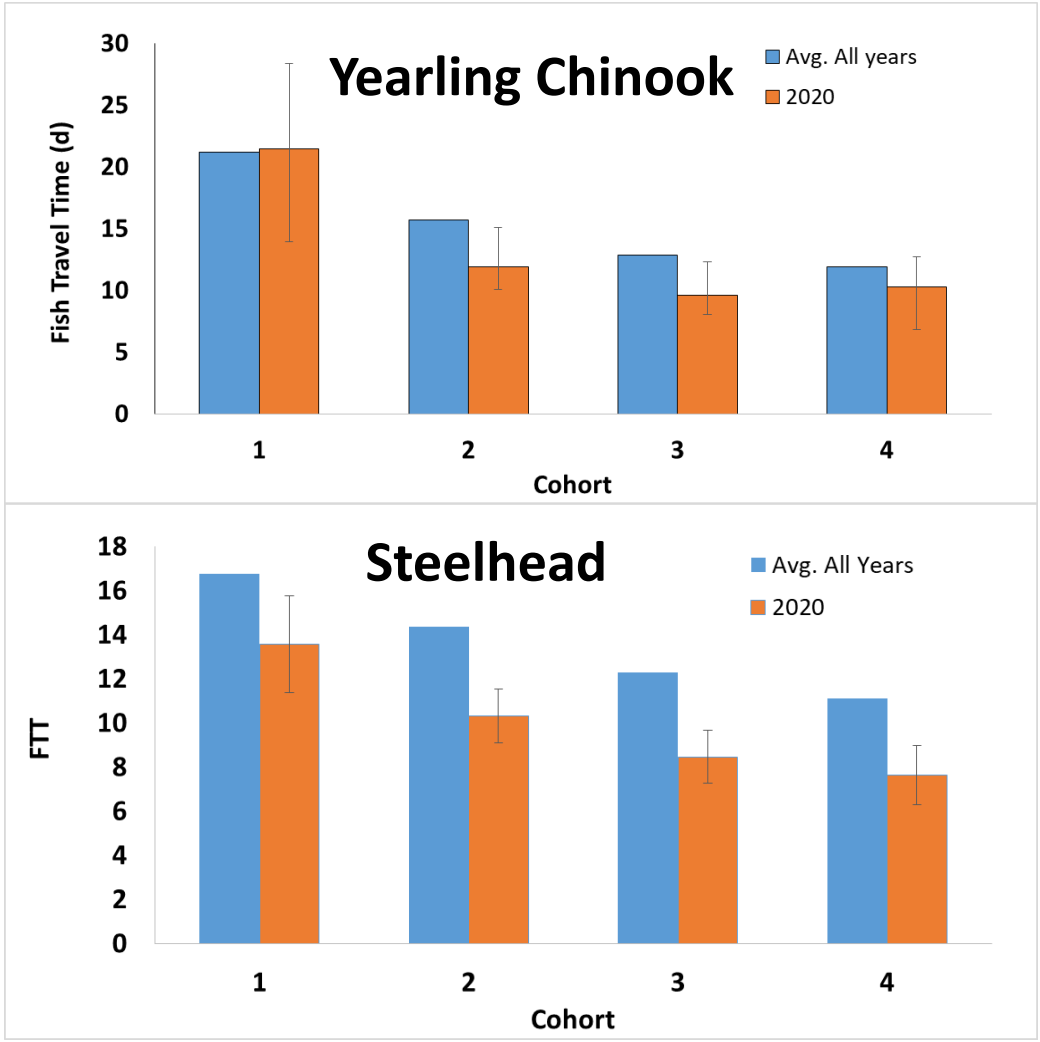
Spring Cohorts LGR to BON – PITPH

- PITPH is the probability of encountering a powerhouse (cumulative PITPH is sum of all 8 dams)
- Cumulative PITPH estimates for 2020 ranged from 1.0 to 1.5 for yearling Chinook and 0.6 to 1.4 for steelhead.
- These cumulative PITPH estimates for 2020 were among the lowest among the 23 years we analyzed (1998-2020).



Spring Cohorts – Impact of Improved PITPH on Fish Travel Time

- Median FTT decreased compared to average FTT LGR to BON for 3 yearling Chinook cohorts and all steelhead cohorts in 2020

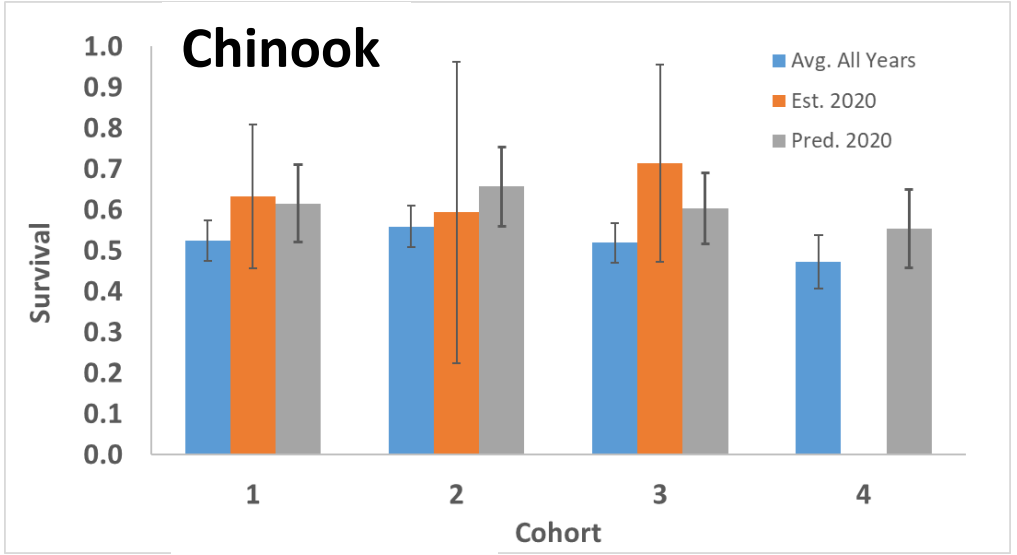


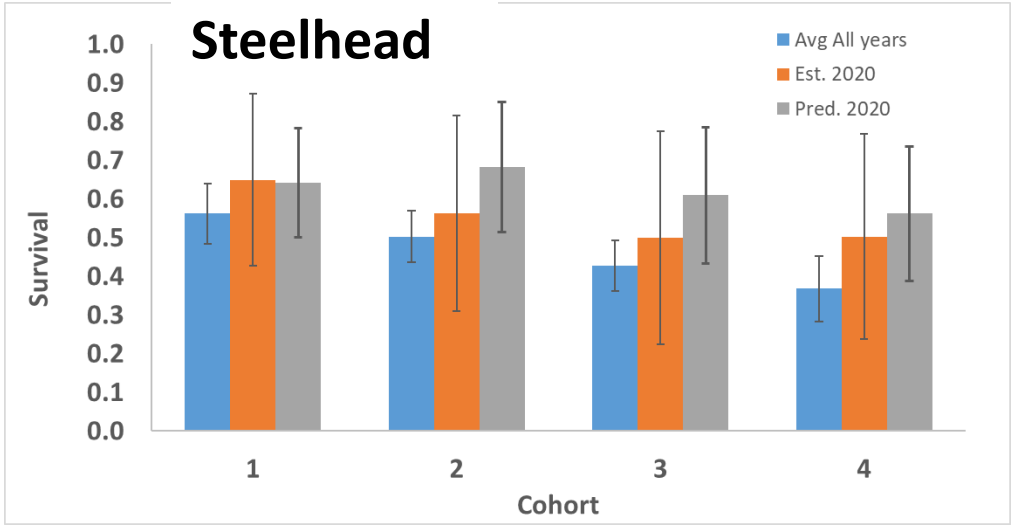
Spring Cohorts – Predicted Impact of Improved PITPH on Survival (LGR to BON)

- Preliminary survival estimates using ASMEBR…no TWX operation due to COVID…Also showing predicted S. We used model of S using PITPH, WTT and cohort (as a factor). Used historic data (1998 to 2019).

- Survivals and predictive models suggest an increase above average survival LGR to BON for yearling Chinook of about 5 to 10% and about for steelhead between 5 and 15% (not significant though).

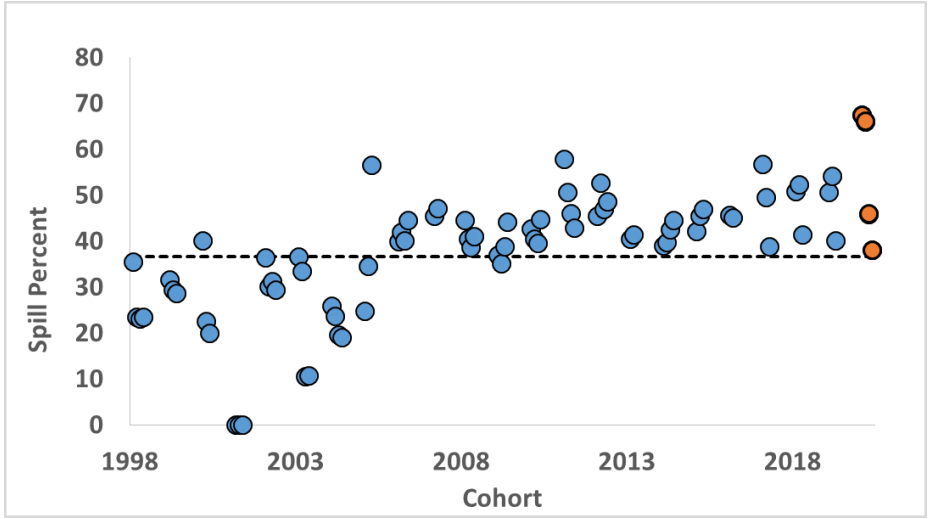
- Survivals **very** preliminary…need more downstream detections to improve estimates of BON detection probability. E.g. steelhead -- bird colonies in 2020 recaptured 0.3% of BON detects (32 of +10K) compared to TWX detects of nearly 2.8% in 2019 (168 of 6K).

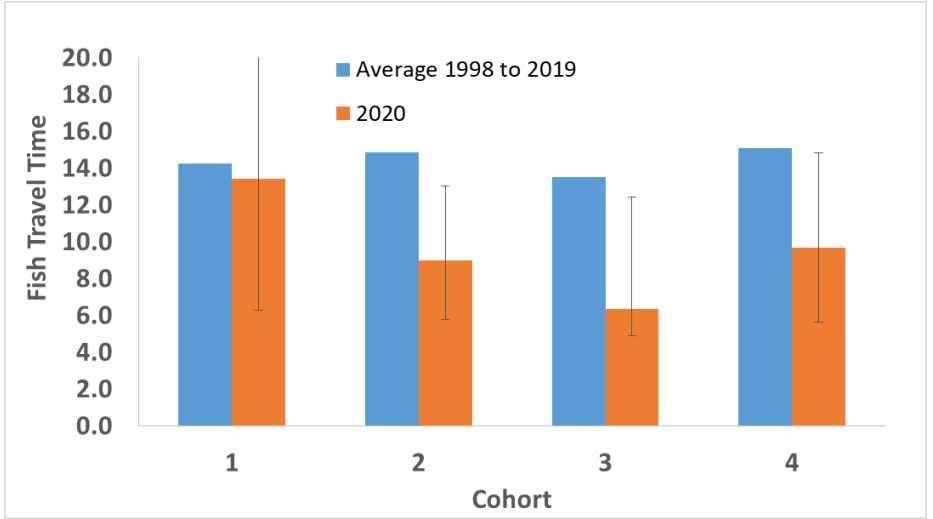




Summer Cohorts – Estimated Impact of Improved Avg. Spill Percent on Travel time (LGR to MCN)

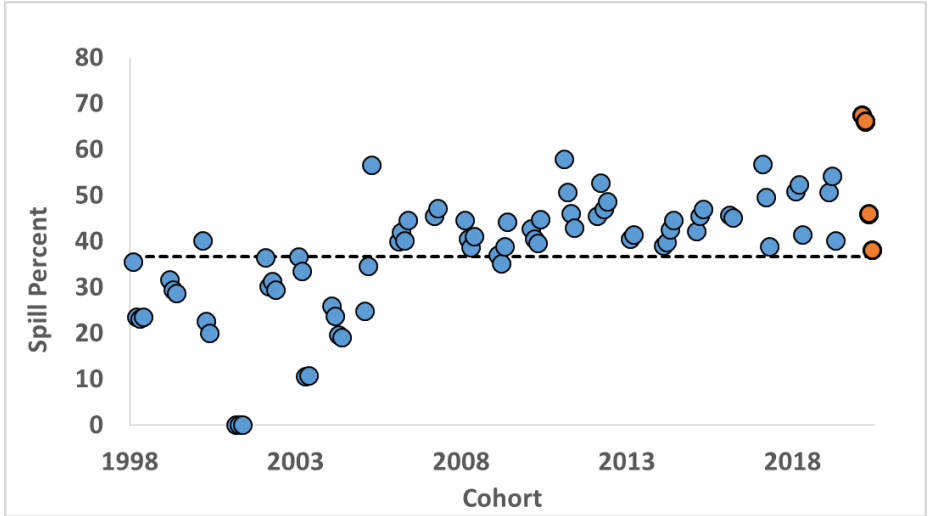
- Spill percentages (LGS, LMN, ICH and MCN) ranged from near average to nearly 68% for subyearling Chinook cohorts in 2020.
- Preliminary estimates of fish travel time show relatively rapid travel times compared to average (LGR to MCN) for 3 of 4 subyearling Chinook cohorts in 2020.

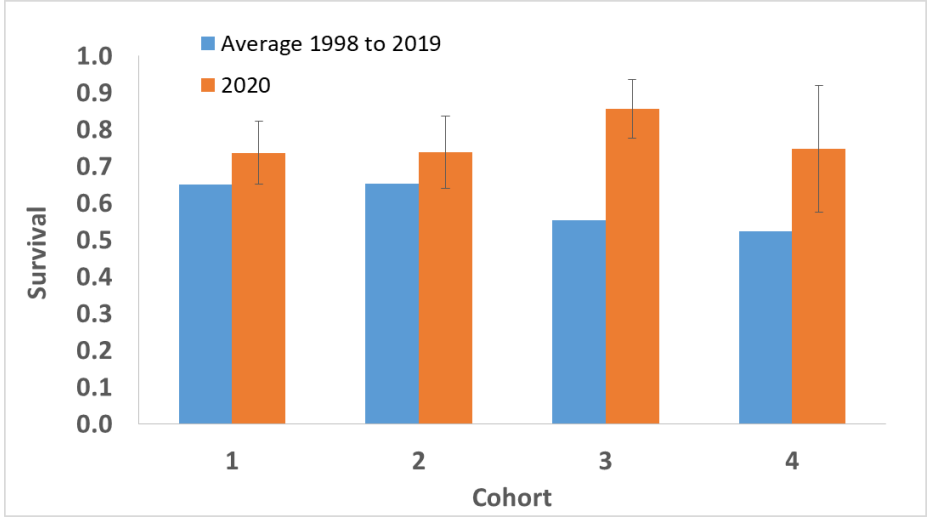




Summer Cohorts – Estimated Impact of Improved Avg. Spill Percent on Survival (LGR to MCN)

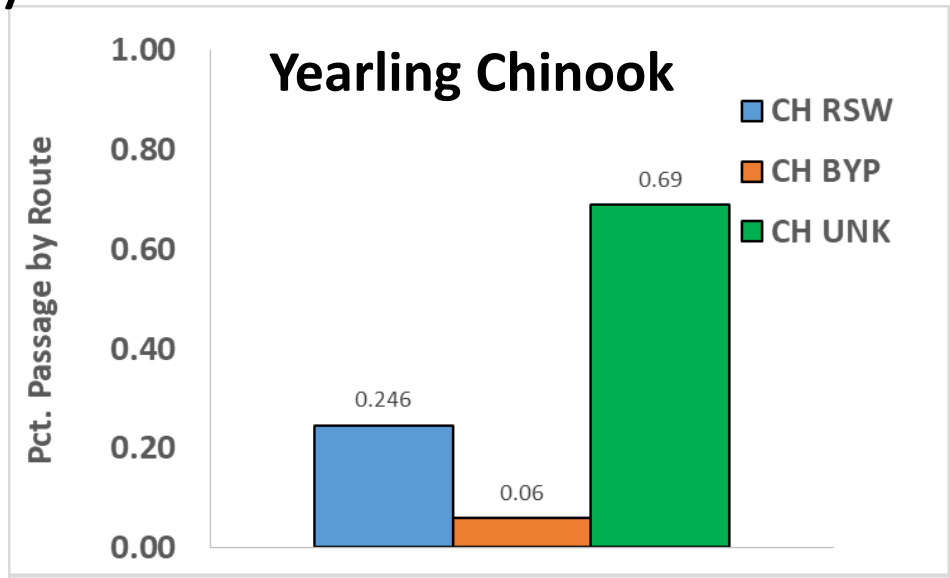
- Spill percentages (LGS, LMN, ICH and MCN) ranged from near average to nearly 68% for subyearling Chinook cohorts in 2020.
- Preliminary estimates of survival suggest an increase above average survival LGR to MCN for all subyearling Chinook cohorts in 2020.

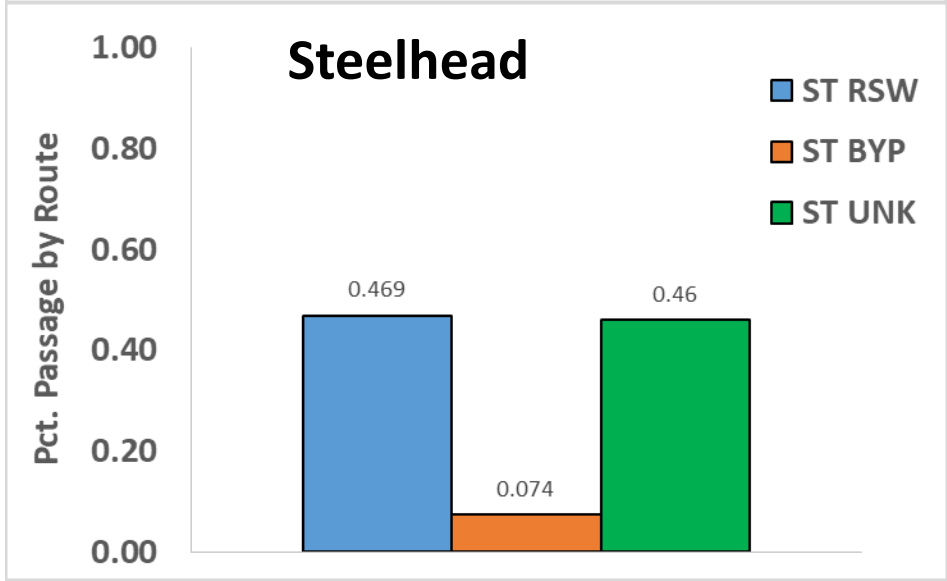




Spring – LGR RSW Passage
Estimated det. Probability by route

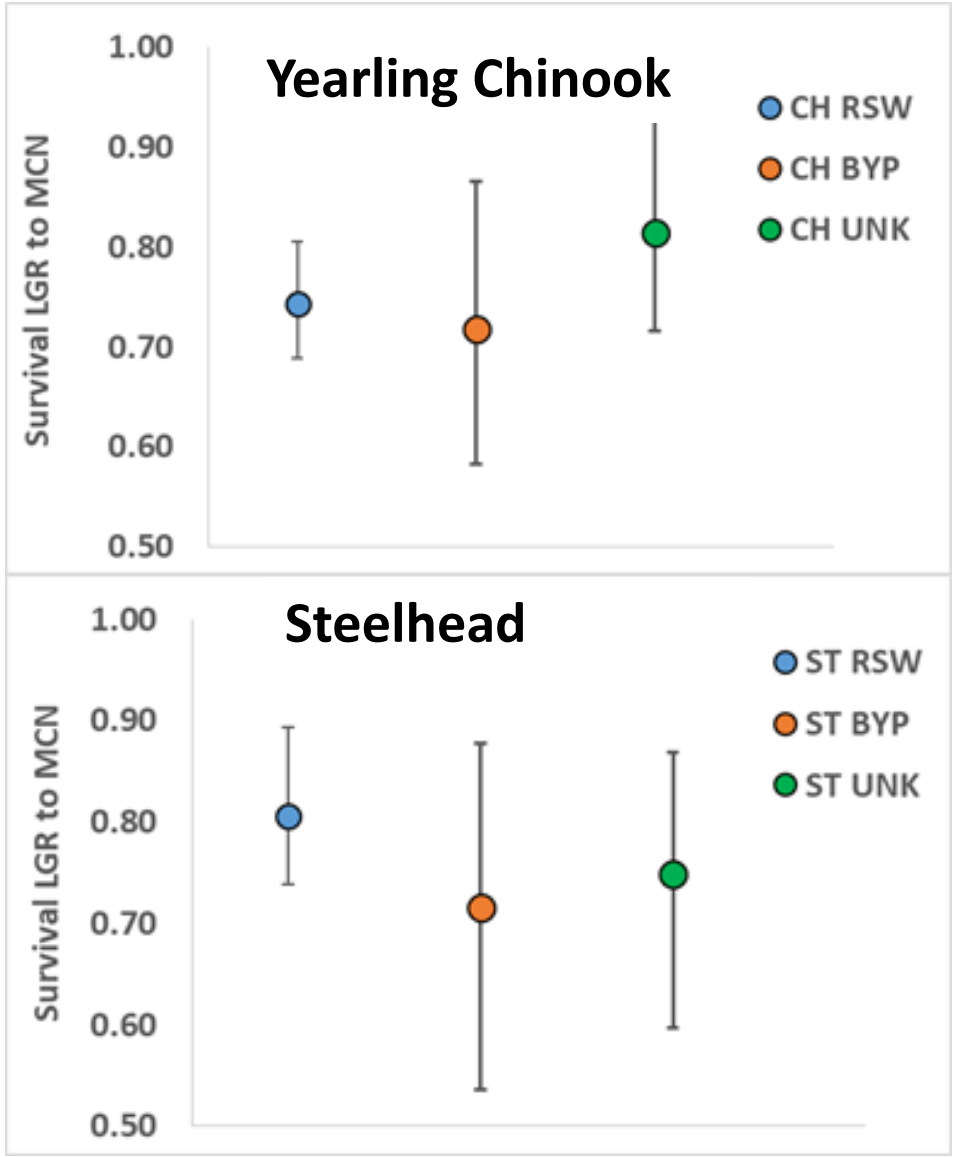
- Estimated percent detection of PIT-tags by route of passage at LGR
- Nearly 25% of yearling Chinook and nearly 47% of steelhead were estimated to have been detected in the RSW.
- Passage through RSW may have been higher (assuming detection probability via that route less than 1).
- Unknown route likely includes spillway, turbines and some RSW passage.





Spring – LGR RSW Passage Estimated Survival by route

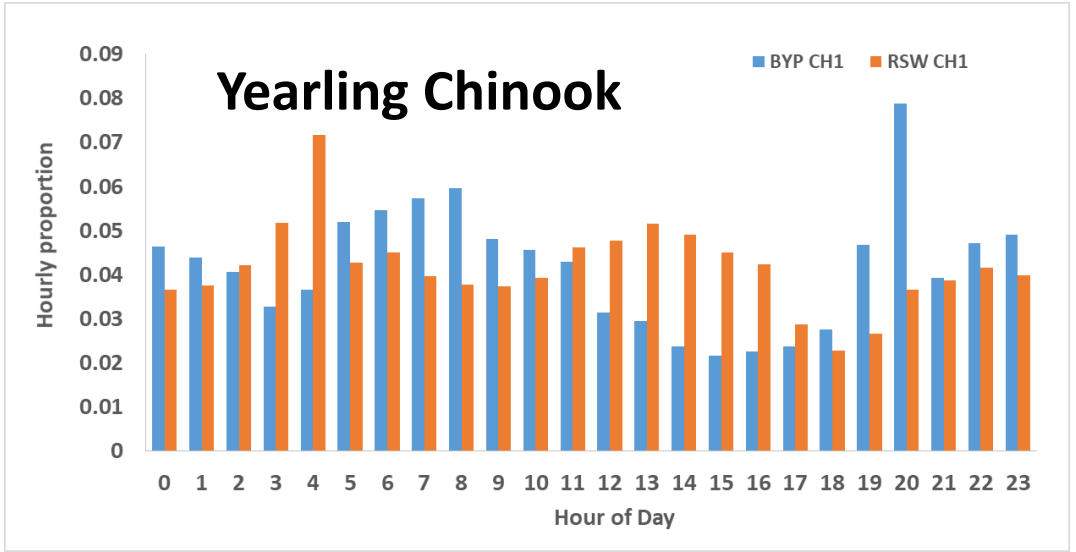
- Survival estimates (LGR to MCN) for routes of passage
- Unknown Route estimated to have highest survival for yearling Chinook, with RSW next and bypass lowest.
- For steelhead RSW survival was highest, followed by unknown, then bypass.

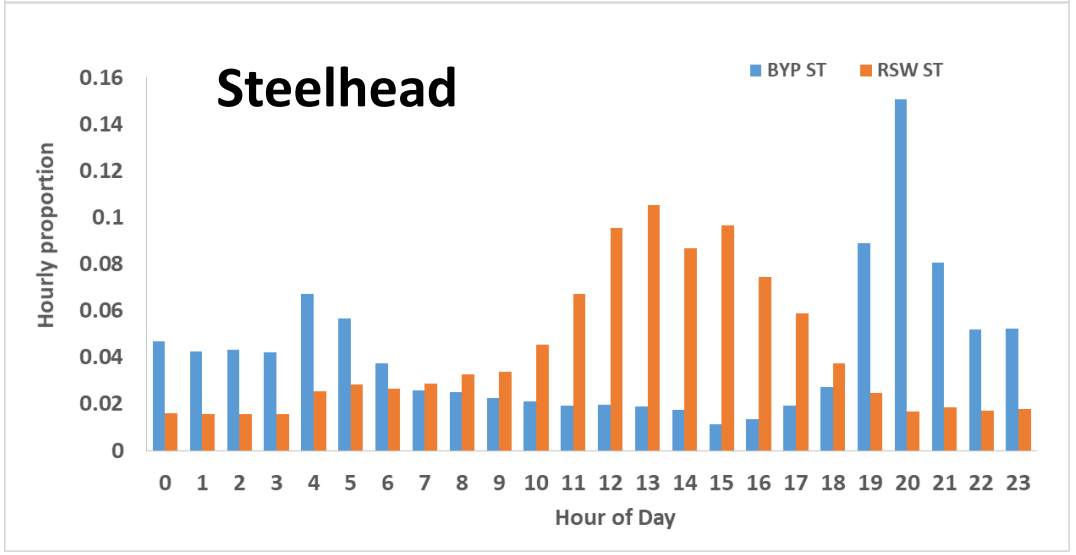


Spring – LGR RSW Passage
Hourly passage proportions

- For wild Chinook RSW passage peaked early morning and during daytime 1100 to 1600 and bypass showed evening and morning peaks 1900 to 2000 and 500 to 800. Relatively flat overall.

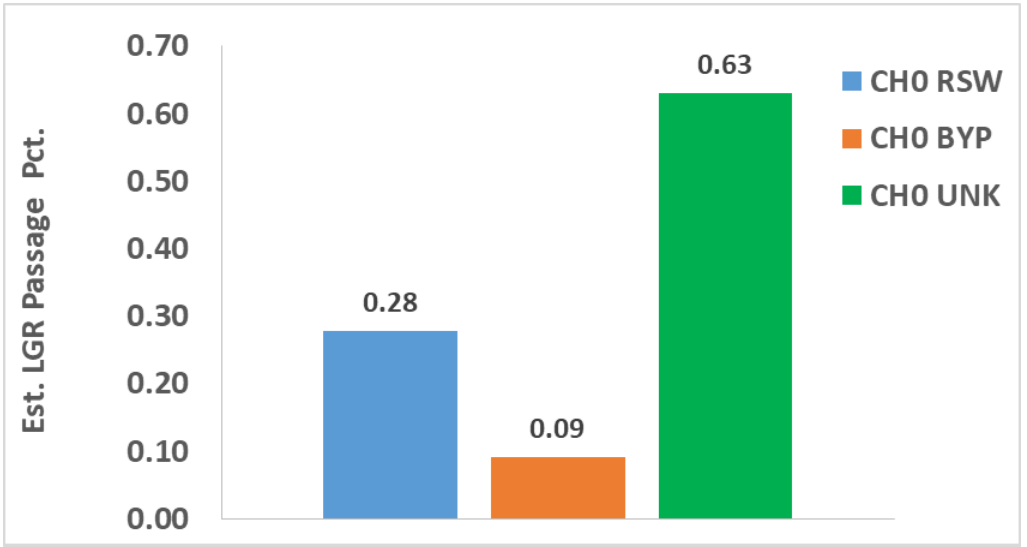
- Wild steelhead also were detected in the RSW highest during daytime with evening peak via the bypass.

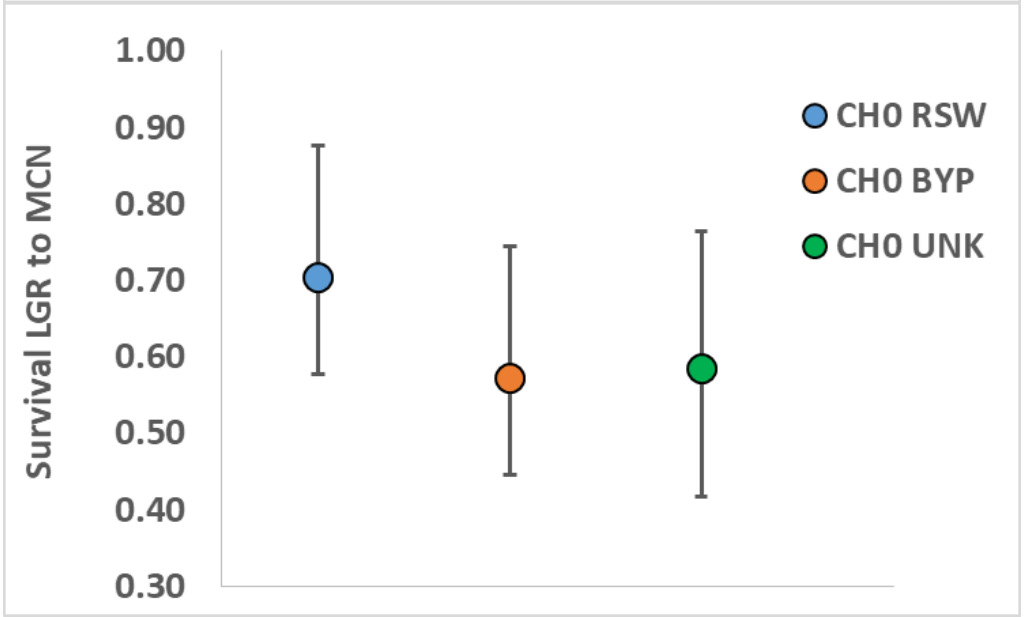




Summer – LGR RSW Passage Proportion and survival by route

- Estimated percent detection of PIT-tags by route of passage at LGR
- About 0.28 of subyearling Chinook estimated to have been detected in the RSW and 0.09 in the bypass.
- Passage through RSW may have been higher (assuming detection probability via that route less than 1).
- Unknown route likely includes spillway, turbines and some RSW passage.
- Survival was estimated to be highest via the RSW at about 0.70, while the other routes were estimated to be nearer to 0.60. Note the wide intervals make them not significantly different.





Summer – LGR RSW Passage Hourly passage proportions

- For subyearling Chinook RSW passage peaked during daytime.
- And bypass passage was nearly opposite with most passage at night.